

to offer up to 2.4 Mbps⁴¹, and satellite access from Spaceway, Teledesic, or Tachyon offering two-way high-speed data links. While Tachyon started offering services to US businesses in 2000 (the equipment costs of \$4,000 per location and monthly service fee of \$470 to \$1,500 make this an unlikely competitor for residential customers), both Spaceway and Teledesic are several years away. Neither will compete for residential customers in the near future.

In summary, the competitive landscape that emerges from current technology deployment and announcements is one where until 2004, Cable and DSL will jointly dominate the provision of residential broadband access. This timeframe provides a useful horizon: by then, broadband residential access will have been available for about 5 years, a period roughly comparable to the existence of second-generation internet.⁴² Throughout the period, cable will enjoy the lead -- a vast initial head-start, progressively decreasing to rough parity over the five year period, assuming that ILECs carry through the substantial network upgrades required. In addition, national market share numbers will likely overstate the amount of real competition between cable and DSL networks as many individual households won't be technically addressable by both systems. In fact, Cable operators and Telcos often are not really competing head-on, having essentially partitioned the broadband access market: cable modems for residences, DSL for small and medium size businesses.⁴³

B. Switching costs are high

In the FCC's analysis, Cable's initial success has created competitive opportunities and "spurred the deployment of Digital Subscriber Lines (DSL)".⁴⁴ If this is the case and if DSL providers have entered areas where they can compete head-on with cable access providers, for competition to serve as a check on cable operators' behavior it needs to be easy for residential consumers to switch from one broadband provider to another. In areas where both broadband cable and DSL are available, competitive discipline only works if the costs of switching from one technology to the other are low enough that consumers do not feel "trapped" by the provider they happened to choose initially. In our view however, these switching costs are substantial, and

⁴¹ see <http://www.qualcomm.com/cda/tech/hdr/whatis.html>

⁴² Netscape 1.0 was released about 5 years ago, on December 14, 1994, providing a convenient marker for the start of the second-generation internet.

⁴³ "Broadband!", op. cit. p. 10-11. See also: "Give Peace a Chance", *Boardwatch*, April 21, 2000 (http://www.isp-planet.com/politics/give_peace_a_chance.html)

⁴⁴ "Broadband Today", op. cit., p. 9

Table 1: Examples of residential switching costs: Cable modems vs. xDSL ^a

	Cable Modem ^b	DSL ^c
Installation	\$103	\$149
Inside wiring ^d	? ^e	\$100
Customer Premises Equipment	\$275 ^f	\$234
One-time setup fee for connectivity	\$137	\$100
One-time setup fee from ISP	? ^g	\$38

^a Figures in this table were averaged from the following product literature and trade press surveys: Excite@Home, "Product Guide." As of August 10, 1999. See "http://www.home.com/"; Depompa-Reimers, Barbara. "DSL gets a boost." *InternetWeek*. March 1, 1999. p. 34.; "Roll out the bandwidth." *Computer Letter*. Feb 8, 1999. p. 1.; Heckart, Christine and Briere, Daniel. *Network World*. "Low-cost DSL, cable carry bottlenecks." *Network World*. Feb 1, 1999. p. 28.; Hamblen, Matt. "Cable Modems." *Computerworld*. June 21, 1999. p. 89.; Tilley, Scott. "The need for speed: Experiences with consumer-oriented, high-speed Internet access technology." *Communications of the ACM*. July 1999. P. 23.; Mandel, Brett. "Broadband hits home." *Infoworld*. July 5, 1999. p. 30.

^b Cable Modem prices given here represent lower-bound estimates, as potentially substantial costs are currently being capitalized by the monopoly Cable carrier, presumably with intent to recoup these costs in monthly billing.

^c DSL prices given here may be skewed toward the high end, because a broader range of high-end offerings were sampled in the articles surveyed.

^d Inside wiring may not be necessary at all locations.

^e Presently paid by the monopoly carrier, presumably with intent to recoup these costs in monthly billing.

^f Cost estimate of what is presently paid by the monopoly carrier—however, with the advent of greater standardization, "modems and set-tops are supposed to become consumer electronics items that consumers pick up and pay for" Higgins, John M. "All for just \$5,000." *Broadcasting and Cable*. May 10, 1999. p. 16-18.

^g May not be relevant to cable modems, as the ISP presently is the cable provider, or closely affiliated—or may be paid by the monopoly carrier.

likely to combine with early deployment lead for Broadband Cable to allow the credible exercise of market power. The switching costs have several sources: the network's physical architecture, its logical architecture, and the "stickiness" that results from structuring one's activities around specific network services.

The physical architecture of the network creates substantial switching costs. Different requirements for inside wiring, different terminal equipment, non-refundable connection charges, different computer set-ups in many cases are among the factors that can easily push the physical cost of switching between Cable and DSL up to \$600 (Table 1 provides a rough estimate of these physical switching costs.) There is much variability in these costs: some cable operator allow their customers to buy cable modems while others include a rental charge in the service fee, different operators and telcos charge different setup fees, and in these early stages, carriers occasionally waive sign up fees.⁴⁵ An additional cost --inconvenience or lost work hours -- comes from the fact that today, both DSL and Cable installation require a service call by a

⁴⁵ For example SBC is currently waiving installation charges and equipment fees until the end of May

technician during business hours (and sometimes, in these early days of the technology's development, several service calls.) These costs should be reduced in the future as both cable and DSL technologies become more robust, and as new technology implementation, such as splitter-less "G.lite" DSL, eliminates the need for a technician visit. At this point however, these various costs add up to substantial hurdles for residential customers, making the switch between broadband access method much more costly and cumbersome than either switching from one DSL provider to another or switching among narrowband ISPs. As a result, broadband cable providers who are not required to offer open ISP choice may well have several hundred dollars' worth of room to maneuver before their customers look somewhere else.

The logical architecture of the network and the associated software also create important switching hurdles. Information access and transmission systems become embedded with one's current provider. This is in contrast to narrowband Internet service provision where customers can switch relatively easily between ISPs and to have equally convenient access to various kinds of content. Let us consider these several costs of switching from one broadband system to another.

First, many everyday communication activities are tightly entangled with one's Internet provider, so that shifting providers may range from the inconvenient to the truly burdensome. With narrowband Internet access, the inconvenience is typically limited to getting a new e-mail address and modifying a few dial-up settings. Already, the absence of an "e-mail portability" equivalent to telephony's number portability represents a non-negligible switching cost. However, switching among broadband access providers would be much more cumbersome because broadband Internet supports an increasingly wide range of new communication activities. For example, for customers who elect to use their "always-on" broadband connection to run web servers from their home, the switch would require a modification of the DNS tables to link their domain name to the new IP address they would receive.⁴⁶ Additional inconvenience would include the loss of adaptive setups that provide ease of access or access to special services. This category of switching cost, we should note, is not specific to cable, but affect users switching either from DSL to Cable, or Cable to DSL, or even among different DSL providers. Their

2000, although this requires a one-year commitment.

⁴⁶ Obviously at this time, this is only a "problem" DSL customers face since broadband cable customers are prohibited from running any kind of server from their home through their cable modem service, per the terms of their service agreement. The cost of that operation depends on the ISP providing the DNS service. For example, Pacific Bell Internet charges \$100 for its DSL customers to link their IP address to a domain name (or to change such link)

dampening effect on competition might be mitigated, though not eliminated, by rules addressing e-mail portability or IP address portability.

Second, if arguments about bundling are correct, competition is all the more stifled. Some market analysts estimate that merely the prospect of bundled services creates approximately \$150 in new value per subscriber for a Cable system, irrespective of value created by the anticipated revenue from each individual service offering.⁴⁷ There may be competitive advantages in the package of services created, advantages in pricing those services, and advantages in a single bill. Indeed, the consumer's preference for one bill is believed to be strong enough to reduce switching, even without price reduction for the services in a bundle.⁴⁸ Consider only the geographic monopolies noted above. In those areas, Cable's competitors cannot create equivalent packages. The ability to include television offerings in its bundles, whatever the rules on control of program content may be, certainly makes it easier for AT&T to create distinctive packages. AT&T could, and apparently intends to offer integrated bundles of phones service (both local and long distance), Cable TV, mobile services, and ISP. If competitors cannot create equivalent bundles, the resistance to switching one component of the bundle -- broadband access-- to an alternate supplier obviously increases. The anti-competitive effect of such bundling strategies will be further amplified through cable players efforts to leverage control of the set-top box and capture an increasing share of upside services.⁴⁹

Finally, and more fundamentally, consumers may never find out what they are missing by being denied open access and thus may never be in position to decide whether switching broadband provider is worth the costs we just described. With traditional products, we tend to think of switching costs as part of a rational decision between two well-known alternatives. For example, customers switching from one brand of cereal to another have all the information they need to make a rational choice: they know the prices, they see the packaging, and they can easily compare objective nutritional value and subjective taste. Not so when picking between two alternative broadband access services. Prices are not always what they seem, with countless

⁴⁷ Higgins, John M. "All for just \$5,000." *Broadcasting and Cable*. May 10, 1999. p. 16-18.

⁴⁸ This represents \$49.5 million of the value of @Home's present subscriber base of 330,000. Estimate of @Home subscriber base from Kinetic Research, cited in: Lash, Alex. "Surfing the Skies." *The Industry Standard*. February 1, 1999. p. 30.

⁴⁹ Galperin, Hernan and Francois Bar, "Reforming TV regulation for the digital era: An international/cross-industry perspective", paper presented at the 28th Telecommunication Policy Research Conference (TPRC), Alexandria, VA, September 25-27, 1999

hidden costs ranging from re-wiring to domain name re-setting, and packaging is less than transparent when broadband services come as part of complicated and hard-to-compare bundles.

More insidious is the difficulty to assess real-life performance (the service's objective "nutritional value") or to really understand the difference between "open-access" and "closed-access" communication experiences (the service's subjective "taste"). Just like cereals, customers can't know what they are missing until they buy the competitor's product and try it out. But unlike cereals, where it is easy to buy two different boxes and give them a taste-trial over breakfast, few customers will subscribe to both Cable service and DSL and benchmark them against one-another before deciding which one they like best. The good news is that whichever they chose, it is likely to be much better than the analog modem it replaces. The bad news is that they will probably never know how much better it could have been, had they picked the other one. Until two years ago, when France Telecom finally decided to take a real stab at offering mass-market Internet access, French citizens thought that second-generation Minitel was very cool. As they marveled at their new Minitel terminals displaying alpha-mosaic images faster than ever before, they never suspected that across the Atlantic (and across the Channel), the web had vastly overtaken their once-pioneering *télématique*.

In such cases, when first-hand information is hard to obtain, we typically rely on others to help us choose. We follow the lead of neighbors, or read *Consumer Reports*. Operationally, for broadband consumers, comparative shopping will generally mean comparing notes with friends and neighbors who have an alternative. There is clear evidence for this behavior from the PC world. PC users, Austan Goolsbee and Peter Klenow have shown, are strongly influenced by their local social network.⁵⁰ But neighbors will not be much help if what broadband access service is available to them depends on which Cable providers control the local monopoly. French customers certainly could not count on their French neighbors to tell them about the Internet. Even trade magazine benchmarking reports may be of limited use because in the short term, until full-fledged third-generation services emerge, the differences between various flavors of broadband Internet access will seem subtle to the residential consumer. Indeed, the average household doesn't directly experience "open broadband Internet-access" or "dynamic caching" but rather the services delivered over broadband access infrastructure --web pages loading faster or smoother streaming video. But even when delivered over a third generation infrastructure, these still remain second generation applications.

⁵⁰ Goolsbee, Austan and Klenow, Peter. *Evidence on learning and network externalities in the diffusion of*

C. The nature of Cable's dominance

The combination of Cable's early and continuing lead with high switching costs strongly suggests that cable owners will hold considerable power over the broadband residential access market. The precise form of market power may vary according to local market conditions. The precise market structure, or set of different local market structures, will only unfold over time. But however the structure of a local market unfolds, it is likely to be less than fully competitive. In some set of local markets -- likely to be a significant set given the limitations on DSL -- Cable will be the only broadband option. There, consumers are likely to be harmed: they will pay the access fees an unregulated monopolist can charge and they will suffer from limitations on the kinds of services offered and the degree of experimentation allowed by the single access provider.

In other local markets the typical residence will possess two active wires capable of carrying broadband video services subsidizing high speed data services. Consumers will then be faced with an asymmetric duopoly, where one players' network is open and the other closed. They will have a choice between the Cable-blessed access provider allowed to operate over the cable line, and the set of ISPs and Local Exchange Carriers buying access over the telephone line from the local incumbent phone company. Is there reason to think that consumers with the potential for dual access would then be worse-off than if ISPs could themselves offer access over either wire? We believe there are two sources of concern.

First--as discussed above--Cable's early lead in deployment, coupled with substantial physical and logical switching costs are likely to give cable operators substantial power even in potential dual access local markets. Second, denying access for non-affiliated ISPs to the cable wire changes the dynamics of the market in which ISPs and CLECs face the RBOC. ISPs and CLECs purchase broadband access and collocate equipment at a regulated price, but regulators cannot fully specify the quality and reliability of service they receive, or the incumbent's responsiveness to ISP requests for assistance and accommodation. A credible threat on the part of ISPs to vote with their feet and desert telephone wire for cable wire would provide significant competitive discipline on the RBOC, enhancing its incentives to provide high-quality and flexible service for ISPs and CLECs. But as long as the cable wire is closed, competitive DSL access providers will face a monopolist in their RBOC. In the end, residential customers would be better served if there was real market competition, with cable and telcos each vying for ISPs' business.

Thus, in markets where Cable and DSL compete, we should not assume that the cable company would then be forced to open its system in order to attract customers. Indeed, by keeping access closed, the cable owner would strengthen the ILECs bargaining position vis-à-vis ISPs, thereby decreasing competitive pressure on its own integrated ISP. By contrast, if both network providers were open, ISPs could then negotiate with the owners of both wires to the home and give their business to the one with the best terms and conditions. Perhaps both network owners would prefer not to cooperate with the ISPs, but if both were open that would be a much harder implicit bargain to strike. Closed-access cable and open-access ILEC would in effect have a common interest in keeping cable closed-access, thus creating the basis for implicit collusion that would strengthen their respective positions over non-affiliated ISPs. So even where cable and DSL are in a position to effectively compete with one another, one can imagine scenarios under which this would not necessarily result in forcing Cable to open access to its infrastructure.

The recent merger announcement between AOL and Time Warner underscores this point and magnifies our concern that competition alone might not be sufficient a source of discipline to yield open access. Despite its considerable pre-merger clout, AOL has vehemently protested against @Home's closed access, suggesting that other smaller ISPs may be even more vulnerable. If open access was so critical to AOL as an unaffiliated ISP, it must be equally critical for smaller ISPs which will find themselves unable to merge with a cable operator. The merged AOL-Time Warner would combine the world's largest ISP and America's second cable operator with 20 million cable households, 85% of which are broadband addressable.⁵¹ It has pledged to implement open access, but we are short on details as the merger is being finalized and winds its way through the approval process.

The consequences for the innovative dynamic of the Internet will be quite different in these three cases: effective monopoly, asymmetric duopoly with one side closed and the other open, and real competition between network owners and amongst ISPs. In all three cases however, we have strong suspicions that competition alone would fail to guarantee open access throughout the emerging broadband infrastructure. As the British regulator OFTEL argued, there must be "rules to deal with market power exercise by firms with control over capacity constrained systems."⁵² Such capacity constrained systems can create "joint dominance", a situation with a

⁵¹ Bernstein/McKinsey, op. cit. p 12

⁵² "OFTEL's response to the UK Green Paper—Regulating communications: approaching convergence in the information age," January 1999. www.oftel.gov.uk/broadcast/gpia0199.htm p.4 paragraph 13.

very limited number of competing suppliers. In that case OFTEL argued that it may be necessary to apply the same rules that govern individual firms with market power.⁵³

III. Nurturing third-generation innovation

To encourage the successful deployment of third-generation internet access infrastructure and the promotion of the accompanying wave of innovation, policy makers need simultaneously to pursue two goals. First, they must ensure that sufficient incentives exist for industry to invest in upgrading existing access infrastructures --cable, phone and wireless-- and to pursue the development of new ones. Second, they must shape a governance framework for this access infrastructure that stimulates innovative competition, not simply between alternative access infrastructures, but also among the service providers (ISPs and others) and the end-users who will take advantage of broadband access to invent and deliver third-generation communication applications.

Much of today's access debate views those two goals as substitutes, in a zero-sum game where we must choose between either setting up the right incentives to generate infrastructure investment, or creating the right framework to foster broad-based competition in services. Following that dichotomous vision, the cable industry warns that open access requirements would destroy its incentives to invest in modernizing the cable infrastructure. It further argues that infrastructure competition is a fine substitute for service competition. ISPs conversely claim that absent open access to cable and phone infrastructures, innovation would be smothered by dominant infrastructure owners.

In our analysis, by contrast, the paramount policy goal should be to balance both goals, because they are equally important to the success of third-generation internet. Without incentives to invest in upgrading existing access infrastructures, there will be no platform to explore and leverage innovative service ideas; and without vibrant competition among alternative uses of upgraded infrastructures, we would explore only a limited set of innovative ideas --those of the infrastructure owners. This section analyzes the two facets of this argument in turn. First, we argue that open access requirements would not eliminate the cable industry's incentive to invest in

⁵³p. 59 of "Beyond the Telephone, the Television and the PC—III," OFTEL's second submission, March 1998, found at www.oftel.gov.uk/broadcast/dcms398/htm. It defines an "open state" as a market where "there is universal access control (i.e., all consumers can enter into a direct commercial relationship with the suppliers of electronic information delivered over electronic networks) and no scarcity of transmission capacity." (p. 9, par. 2.6)

the deployment of third-generation access infrastructure. Second, we show how a closed access infrastructure channels innovation along the sole interests of the infrastructure owners. With the previous section's assessment of the competitive situation, this lays the groundwork for our concluding section exploring possible policy approaches to escaping this false trade-off between infrastructure investment and service innovation.

A. Sustaining investment in third-generation access infrastructure

The cable industry argues that if it cannot impose its affiliated ISP as the exclusive choice for cable broadband access, its network upgrades will be too risky and unprofitable to warrant the large investment needed. The consequence, it is implied, would be to stall the deployment of a digital cable infrastructure, holding back not only the wide diffusion of broadband internet access and digital television, but also the emergence of a nationwide facilities-based competitor for residential telephony. This argument resonates strongly with the FCC, whose preliminary findings repeat the industry's threat that "regulation or the threat of regulation ultimately slows deployment of broadband".⁵⁴ Separately from the broadband access debate, the FCC is quite eager to encourage facilities-based local telephony competition, and AT&T's suggestion that open access requirements might slow that as well appear to carry weight. This line of argument was first and most extensively laid out in a December 1998 filing by the National Cable Television Association (NCTA).⁵⁵

On this issue of investment incentives, our view differs from that of the NCTA in a number of respects. First, we note that the claim that regulatory constraints will hinder investment is not new and that in fact, throughout its history AT&T has repeatedly argued along these lines against opening its network to devices like Carterfone or alternative service providers like MCI. Regardless, regulatory action to introduce competition proceeded and network investment continued. Second, the argument omits to point out that a great deal of investment to upgrade cable facilities has already been undertaken within a very protected environment. Indeed, cable networks are franchise monopolies in most markets and they are built, capitalized and largely upgraded under a monopoly market operation. For example cable operators deployed

⁵⁴ "Broadband Today", op. cit. p.33.

⁵⁵ Owen, Bruce M., and Gregory L. Rosston, Cable Modems, Access and Investment Incentives, filed on behalf of the National Cable Television Association, December 1998.

more fiber in 1997 than all the RBOCs combined.⁵⁶ When it acquired TCI, AT&T did not buy companies in competitive markets, but rather bought a set of video distribution monopolies. These monopolies had, arguably, largely made the decision to upgrade their networks to digital video in order to compete with direct broadcast and, perhaps most importantly, to offer cable-based phone service.

Third, these investments, and the large sums AT&T spent to acquire these companies, were predicated on more than simply broadband internet. In particular, upgraded local cable plant would allow AT&T to save considerable sums in access and interconnection fees, estimated to run as high as fifteen billion dollars in 1998, about a third of its domestic wireline revenues.⁵⁷ Cut those charges in half and AT&T's net income doubles. Some estimates suggest that AT&T plans to have extensive and exclusive cable/phone penetration in four to five years. In that case, gains from video services, let alone Internet access, are just gravy.⁵⁸ Seen that way, AT&T will obtain Internet access for a small marginal cost, since the modifications required to add Internet capacity to an existing digital Cable system are much lower than the estimates of the costs required for upgrade of the digital network itself.⁵⁹

Fourth, the cable industry claims that open access regulation would reduce its revenues and its incentives to invest. The FCC repeats these claims, reporting that "there was near unanimous agreement among the cable and investment panelists that government regulation of the terms and conditions of third-party access to cable systems would cast a cloud over investment".⁶⁰ Several analysts however, including Merrill Lynch and Jupiter Communications

⁵⁶ 1998 Multimedia Telecommunications Market Review and Forecast, Telecommunications Industry Association, 1998, p. 46. Cited in Mackie-Mason, "Investment in Cable Broadband Infrastructure: Open Access is Not an Obstacle", November 5, 1999 (<http://www-personal.umich.edu/~jmm/papers/broadband.pdf>)

⁵⁷ Larry Darby, "Open Access: The AT&T Internet Business Case?" The Last Mile Telecom Report, August 12, 1999.

⁵⁸ MacKie-Mason, op.cit. p.12

⁵⁹ Providing broadband Internet access via cable modem is estimated by the FCC to cost the cable operator \$800-1000 per subscriber. Federal Communications Commission. "Deployment of advanced telecommunications capability to all Americans in a reasonable and timely fashion, and possible steps to accelerate such deployment pursuant to section 706 of the Telecommunications Act of 1996." (Report) CC Docket No. 98-146. February 2, 1999. chart 2. Federal Communications Commission. "Annual assessment of the status of competition in markets for the delivery of video programming." (Fifth Annual Report) CS Docket No. 98-102. December 23, 1998. para. 40. DePompa-Reimer, Barbara. "Cable modems, wireless networks slow to spark interest." *Internet Week* 34 (1). March 1, 1999.

⁶⁰ "Broadband today", op. cit. p 34

believe on the contrary that open access would be profitable for cable operators,⁶¹ because it would create additional wholesale revenues. MacKie-Mason's own detailed economic modeling of this question on behalf of the Open Access Coalition, shows in fact that open access would yield substantial revenues for cable operators.⁶² Such economic models, just like the less-quantitative claims of the NCTA economists, are obviously always subject to argument. MacKie-Mason however also points to compelling additional evidence in what he calls a "controlled experiment": The Canadian CRTC's 1996 announcement that it would require open access didn't stop investment and in fact, the major Canadian cable operators are ahead of their US counterparts in deploying broadband facilities.⁶³

In summary, we believe there is ample reason to strongly question cable's claim that open access requirement would stop the deployment of broadband cable access. We might also add that, if open access requirements were such an obstacle to broadband deployment, it would be appropriate to call for lifting such requirement from the ILECs. But continuing regulatory requirements that they open their network to all ISPs appear not to stop the telcos from carrying out ambitious DSL deployment. Perhaps they would race to deploy DSL even faster, were it not for these constraints. But in their case, policy makers have apparently decided that deployment speed is not the only value at stake. They instead decided that fostering an open innovation environment was an equally worthwhile goal, even at the cost of an hypothetical deployment slowdown.⁶⁴ If this logic is appropriate for the FCC's Common Carrier Bureau, why is it unfit for its Cable Services Bureau?

B. Fostering innovation in third-generation applications

Closed access control would allow cable owners to pursue only the exploration and deployment of those third-generation services that directly benefit them. This is not to say that no innovation will take place, simply that only the technology trajectories that line-up with their interest will be pursued. As a result, the kind of wide-ranging, open innovation and experimentation that has been central to previous generations of Internet explosion will be stifled.

⁶¹ MacKie-Mason, op.cit. p. 35

⁶² MacKie-Mason, op.cit.

⁶³ MacKie-Mason, op.cit. p.27.

⁶⁴ For a similar argument, see Lemley, Mark and Lawrence Lessig, Written ex-parte in the matter of the application for consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp., FCC CS Docket 99-251, 1999.

We examine here the early experience with the Excite@Home broadband offering, as an illustration of the of implications of such an incentive structure. While the practices of Excite@Home are perfectly understandable and legal, they create concerns when they have no alternative. We separate two categories of consequences: first, the restrictions imposed on end use and second, the upstream implications of closed network architecture for electronic communication and commerce.

First, @Home imposes a number of restrictions on its customers' usage patterns. Of course, any network owner, left unconstrained, will logically attempt to shape network uses along patterns that best serve its own interests and @Home understandably configured its service so as to force usage that fits the specific patterns that generate the most profits. Excite@Home's limits on what its users do are spelled out in the "acceptable use policies" they agree to when they subscribe to the service. The overall internet usage pattern encouraged by Excite@Home is strongly aligned with a vision of third-generation internet as an extension of a broadcast network: a communication where traffic patterns are asymmetrical, where users download much more than they send and where users are passive consumers, rather than publishers of multimedia content.

The practices involve a number of elements.⁶⁵

- a) Limits on up-stream traffic, that curtail consumers' ability to experiment with their own uses of the network including internet telephony and interactive video conferencing.⁶⁶
- b) Prohibitions on setting up any kind of server.⁶⁷
- c) Technical biasing against and limits on the performance for non-partner content that will structure the cyber marketplace, limiting experimentation and innovation.
- d) Prohibitions on using Excite@Home for work-related activities, for which customers are expected to purchase the more expensive (and DSL-based) "@Work" service.

⁶⁵ See: At Home Corporation. *@Home Acceptable Use Policy*. <http://www.home.com/support/aup/> (Last modified: September 21, 1999 - visited May 1, 2000); At Home Corporation. *@Home User Guide*. <http://www.home.com/support/netscape/> (Visited May 1, 2000); At Home Corporation. *@Home Frequently Asked Questions*. <http://www.home.com/support/netscape/faq/faq.html> (Visited May 1, 2000)

⁶⁶ "Excite@Home speed caps draw fire, prompt new plans", Corey Grice, CNET News.com, June 28, 1999, (available at <http://www.news.com/News/Item/0,4,38479,00.html>)

⁶⁷ "Examples of prohibited uses include, but are not limited to, running servers for mail, http, ftp, irc, and dhcp, and multi-user interactive forums" see <http://www.home.com/support/aup/>

That means it will be difficult to hook up to corporate LANs from home, which will limit the present diffusion of innovative forms of work at home.

- e) In order to enforce these rules, @Home must constantly monitor its customers' data traffic, raising serious privacy concerns.⁶⁸

Arguably, these restrictions flow from the limitations of cable technology. They represent however @Home's own approach to dealing with these limitations, encouraging communication patterns that happen to fit well with @Home's business strategy. It would certainly be interesting to see how innovative non-affiliated ISPs might explore alternative ways around these limitations.⁶⁹ However, while it will still be possible to receive Internet service from other ISPs, though still paying for @Home ISP service, alternative service providers will be denied access to key network performance features of the @Home infrastructure, such as dynamic caching and collocation on the @Home network. Closure and usage limits thus preclude experimentation with a range of alternative patterns of use, in a provider dominated context reminiscent of telephony's pre-deregulation, pre-Internet era. By contrast, open access to Cable would allow dynamic network innovation in the broadband era to unfold with the force, pace, and innovative imagination of the narrowband era. The development logic that has characterized the Internet to date could continue.

Second, whoever owns the network, absent competitive or regulatory constraints, will also logically try to extend its infrastructure ownership into control of the services and content it carries. There are clearly a range of strategies available for the provider of a large cable modem network to bias Internet access to the advantage of some content providers over others. Though some may be intelligent ways to speed up the Internet experience for customers (dynamic caching

⁶⁸ See "Excite@Home: Protection Or Invasion?" By Karen J. Bannan, Inter@ctive Week, June 21, 1999 (Available at <http://www.zdnet.com/intweek/stories/news/0,4164,2279510,00.html>):

"One percent of the subscriber base is responsible for 80 percent of the traffic flow. We're just watching to make sure this group of users that are trying to use a \$40 product like a \$1,200 T1 [1.5-megabit-per-second] line don't spoil it for the rest of the users," said Milo Medin, the company's chief technology officer.

The company not only tracks how much traffic is going and coming into a specific household, but it also tracks where the traffic goes once it leaves the home and what kind of data is being sent and received, he said. Don Hutchinson, senior vice president of the company's @Work division, said Excite@Home tracks a customer's data destination in order to pinpoint where it might need to better improve connections to its backbone. In addition, the company said, monitoring individual usage helps the company upgrade its services.

⁶⁹ As a comparison, the open DSL market is starting to spur innovative ways to exploit DSL technical characteristics, for example the provision of multiple voice lines over a single DSL line.

is a good example), these practices could easily become abuses of dominant position if applied differentially to different service and content providers. Indeed if a single ISP has sole access to these strategies, it can then at its discretion, and at its discretion alone, systematically shape what content and services gets to the end-users under optimal conditions. Further, it could shape the very terms of innovation on the Internet, deciding who gets to experiment and who can capture the resulting benefits. Open access by contrast, would assure that other ISPs could use the Cable infrastructure to pursue similar approaches, where appropriate, and would foster healthy competition of network applications, programming and architecture.

In the present case, AT&T/@Home strives to leverage its Cable access monopoly into e-markets that ride on top of Cable access, well beyond the bundling of Internet service provision with other AT&T services. The @Home 1998 annual report⁷⁰ is very clear on these strategic practices and includes details of how @Home offers speedier service to Internet content providers who agree to become "content partners" and share their revenue stream.⁷¹ Under the sole control of a broadband access monopoly, the potential for serious abuse is evident. Consider in particular:

"The @Media group offers a series of technologies to assist advertisers and content providers in delivering compelling multimedia advertising and premium services, including replication and co-location. Replication enables our content partners to place copies of their content and applications locally on the @Home broadband network, thereby reducing the possibility of Internet bottlenecks at the interconnect points. Co-location allows content providers to co-locate their content servers directly on the @Home broadband network. Content providers can then serve their content to @Home subscribers without traversing the congested Internet."⁷²

Further, the report notes that:

"we have established relationships with certain of our interactive shopping and gaming partners whereby we participate in the revenues or profits for certain transactions on the @Home portal. We also allow certain of our content partners to sponsor certain content channels for a fee."⁷³

⁷⁰ The 1999 Annual Report is much more vague about the specifics of these practices. There are however no indications that they have been abandoned.

⁷¹ At Home Corporation 1998 Annual Report. February 29, 1999.

⁷² Ibid., p. 8.

⁷³ Ibid., p. 9.

These quotes describe two strategies aimed at shaping the architecture of the cyber-marketplace. The first is “collocation”, the second is “replication”. Both function to allow @Home to privilege partners and exclude competitors – they differ only slightly in their implementation. @Home has developed partnerships with non-competing firms in each of several content areas (interactive shopping, gaming, digital audio, digital photography, and search services) and it is presently collecting “fees relating to content partnering arrangement”.⁷⁴ In keeping with its Cable origins, @Home sees these practices as “programming” and it sees itself as “programming the Internet.”⁷⁵ @Home is promoting itself as offering collocation service to bring better performance to @Home customers (merchants as well as end-users), but the term “collocation” is not meant in the nondiscriminatory sense that those familiar with telecommunications are wont to use. Rather, each partnership appears to be exclusive to a particular area of content. A collocated partner has faster access to @Home consumers because of a presence on the same network. In 1999 @Home already collocated at least one partner (SegaSoft) and was planning to collocate others.

Replication is manipulation of the caching system to favor partners. It essentially speeds requests for certain content by pre-loading it at sites that are close and well-connected to subscribers. As of 1999, @Home replicated news feeds from CNN and Bloomberg. @Home then promotes replicated and collocated partners on its portal and with its “wizards”, making competitors harder to get to. The result is the creation of a cyber-marketplace which systematically favors the providers of content, services or transactions who have a privileged financial relationship with the monopoly owner of the infrastructure which supports that cyber-marketplace. If customers had a real choice of broadband access infrastructure, this would matter less, but within the current situation, when they become customers of @Home's access infrastructure, they automatically and unknowingly receive access to a cyber-marketplace biased to favor @Home's financial partners. As of 1999, @Home had such agreements with partners including Amazon.com, BuyDirect.com, AutoConnect, N2K, PC Connection, QVC, Realtor.com, Reel.Com, Travelocity, Bloomberg Radio, CNET Radio, Net Radio, SportsLine and Spinner.com.⁷⁶

⁷⁴ Ibid.

⁷⁵ Ibid., p. 8.

⁷⁶ Amicus Curiae Brief of Excite@Home, Re: AT&T v. Portland, August 16, 1999. esp. footnotes 17, 18, 19 and 20. (<http://techlawjournal.com/courts/portland/19990816exc.htm>)

In addition, it certainly is possible to manipulate the caching architecture in many other ways to favor partners. @Home has the incentive, given its relationship with content providers, to further utilize the caching system to actually slow requests to competitors' "programming", rather than merely speeding up access to its own brands.⁷⁷ @Home's annual report also notes that "local caching servers can compile far more comprehensive usage data than is normally attainable on the Internet".⁷⁸ If this data were shared with partners, this would create a further barrier to competition from non-partner content providers. Not only could an @Home partner know detailed information about @Home subscribers using their service, it would also be possible to know the same detailed information about who was using a competitors' service or to restrict access to a competitors' service while substituting their own.

In summary, @Home proposes in its own materials to structure a cyber-marketplace that steers @Home customers, unknowingly, toward merchants who partner with @Home. @Home can structure the cyber-marketplace both through the advantageous positioning and access of partners and through @Home's devices such as "How-Do I" wizards.⁷⁹ @Home's own reports explain how they will provide superior quality performance to partnering merchants on their network. If you are a merchant, either you are on @Home's service network or the majority of broadband customers (those that use AT&T@Home cable service) will not be able to access your site, as you intended.

Opponents of Open Access requirements believe that market forces will naturally bring cable operators to open their networks because they will want to maximize the amount and diversity of content available to their subscribers. Jim Speta⁸⁰ explains that, while telecommunications networks derive value from connecting people to each others and thrive on direct network externalities (the more connections, the greater the value of each connection), cable networks derive value from bringing content to people and benefit from indirect network externalities (the more content, the greater the value of each connection). Therefore, he argues,

⁷⁷ In their joint letter to FCC Chairman Kennard, dated July 29, 1999, the Consumer Federation of America, Consumers Union, Media Access Project, and the Center for Media Education have documented a variety of such possible manipulations. The technical basis for their claims is laid out in "Controlling Your Network: A Must for Cable Operators", Cisco White Paper, 1999. A copy of that letter is available at <http://tap.epn.org/cme/kennard.html>

⁷⁸ At Home Corporation 1998 Annual Report, p. 10.

⁷⁹ @Home describes the "wizards" at <http://www.home.com/howdoi.html>

⁸⁰ Speta, J., (2000), Handicapping the Race for the Last Mile?: A Critique of Open Access Rules for Broadband Platforms, Yale Journal on Regulation, 17 (1) pp. 39-91

"a broadband access provider has the incentive not to restrict the market for information services and the availability of those services to its subscribers *even if* it has a monopoly in the provision of broadband access".⁸¹ This view overlooks strategies such as those we just documented in @Home's case. Indeed, as @Home argues to its investors in its annual report, a cable operator clearly benefits from using its control over network architecture to design a biased cyber-marketplace, favoring affiliated content and network services, *especially* if it has a monopoly in the provision of broadband access. In this respect, @Home is acting very much like Microsoft using its control of the operating system's architecture to favor some applications over others, with similar anti-competitive implications.

These capacities to structure the cyber-marketplace are of startling significance, especially when customers are unaware of the marketplace's structured biases. They are particularly important if a single ISP has a local monopoly and of broad significance if a single ISP holds stakes in enough local monopolies or dominant positions locally to influence the very structure of the cyber-marketplace. And, we should note, even allowing the choice of another ISP for no additional fee (for example if customers could choose to substitute AOL for @Home as the default ISP over their broadband cable access) would not correct the competitive problems created by broadband access architecture that rewarded @Home with performance advantages over all rivals. There are at least two reasons.

First, electronic commerce is certainly one of, if it is not the killer application of the broadband era. The unfolding of e-commerce will drive innovation throughout all segments and elements of a competitive network. Yet suddenly the competition across segments and elements that has driven the evolution will be squeezed into and captured by a vertical structure with a single buyer, the ISP provider: @Home. Second, business to business e-commerce has dominated until now. Broadband will facilitate the full-fledged emergence of retail e-commerce. Closed access would, as a matter of policy, permit @Home to structure the cyber marketplace for a significant portion of the American consumer population. With control of the broadband service provision, @Home would become a truly dominant influence in American retail. Even if @Home's control of the broadband market were more limited, it would nonetheless structure the cyber marketplace used by a substantial number of American consumers. The biases will not be immediately obvious and they will not necessarily be brought to the attention of the consumer. The competitive possibilities of e-commerce, ease of entry and experimentation producing new

⁸¹ *ibid.* p. 84

business strategies and new business organization, would be wiped away. Broad gains to the American economy would be lost.

In the absence of a policy requiring open access, the suppliers of the network component and services, the merchants seeking to reach consumers through the cyber-marketplace, and the users of the network will confront AT&T/@Home's market power. The Internet and e-commerce will then evolve as the result of strategy choices made by AT&T and @Home alone, not as a result of market competition. Is this the "digital economy" we really want?

IV. Conclusion: Dealing with Joint Dominance

Joint dominance in broadband access, even monopoly power over broadband access in many cases, raises serious threats to the public interest. If the joint dominance continues, the absence of a policy to assure open access, the resulting vertical integration and closed access defeats the fundamental innovation dynamics that have made the Internet successful. Open standards, open access, a clear set of competitive principles and prohibitions against leveraging access control into control of service architecture, cyber-marketplace, communication patterns and content will all wane. Vertical disintegration has traditionally led to real competition and innovation in each segment, as well as competition and innovation in alternative ways to package combinations of services.

The policy problem arises at the moment at which the cable television "broadcast" system, built up with local monopolies and successfully built out because of the appeal of cable TV offerings, is being transformed into a broadband digital system and integrated into the national communications network. The current debate stems from the collision of the policy legacy of Cable's monopoly and restricted access origins, with the evolving Open Access thrust of telecommunication policy that has enabled the successful explosion of competition throughout the telecom network segments, ushering in user-driven innovation and the Internet revolution. Reversing the set of policy innovations that have led to broad American communications leadership would be unwise, at best.

But what can be done? We think that the most important point is to recognize that the situation is ripe for an explicit set of policy decisions, not wait and see. The question as to the right prescription is not one that we wish to resolve here. But we would offer some observations about how to proceed.

To begin, some believe the main policy issue is that consumers should not have to pay twice for use of an ISP other than @Home. This emphasis on nondiscriminatory access to the broadband Cable network for all ISPs, they suggest, requires only a light regulatory touch. But, however light, the touch may be essential. The FCC might write the requirement into decisions on the AT&T-Media One and AOL-Time Warner mergers. Other countries would have to find appropriate policy instruments, as we discuss shortly.

Just as importantly, a nondiscrimination rule in itself would not solve the underlying problems that we have described. For example, suppose that the rule simply said that non-affiliated ISPs will pay the same as @Home for access to the Cable broadband network. This would not prevent AT&T from taking its rents on the network access charge and simply bundling in @Home for no fee. This would be like Microsoft making its money off Windows while charging nothing for its browser.⁸² Is this satisfactory, or not? After all, these ISPs could change their business model to the one used by Yahoo (or AOL in its UK operations for some customers) where there is no monthly charge for email and access. Revenues derive from ads and sales commissions.

Arguably, the “don’t pay twice” rule, while straightforward, only addresses one of the least important issues discussed in this paper. The real issue is the ability to achieve an open architecture for broadband services. Policy makers should aim to stimulate innovative designs and uses of the network. But the vertical arrangement between the AT&T/TCI broadband network and an ISP may defeat this because the network will be optimized to give superior performance to the preferred ISP and superior service to the ISP’s favored partners.

As we have stressed throughout this paper, the problem is not just the adverse effect on competition in the markets for Internet service provision. The closed architecture of the underlying broadband network will also restrict access to the “network performance features” that are so vital to innovation. In its decision on the AT&T purchase of TCI the FCC rightly expressed concerns about some matters of the network architecture, but settled for rather toothless promises by AT&T in its filings to the Commission.⁸³ The right question is whether there are

⁸² In effect, it is like the first DOJ consent decree with Microsoft whereby Microsoft ended its licensing agreement provision that charged OEMs for Windows on every system that they shipped (even if the OEM had installed Unix or OS2 on the computer instead of Windows).

⁸³ FCC Memorandum Opinion and Order approving the AT&T - TCI Merger, February 18, 1999 (FCC 99-24).

policy options that are lighter handed than the regulatory regime for DSL imposed on the ILECs and yet responsive to the issues posed by broadband cable networks.

It is precisely in regard to the intersection of market power, even jointly shared with other providers, and network architecture that the British telecom regulator, OFTEL has engaged in a powerful dialogue. OFTEL's analysis has changed over time but captured many of the right policy questions. This initiative is particularly interesting because OFTEL, while being a strong advocate of competition, has generally been less disposed than the FCC to "unbundle" network elements for local access. Yet in 1999 OFTEL argued that the regulator should use its power to force disclosure of the underlying network architecture, and a form of mandatory mediation among all stakeholders about how to make the architecture sufficiently nondiscriminatory in order to blunt the worst abuses of market power. The OFTEL idea was one way to think about an intermediary policy solution. It was not proposing anything like unbundling of network elements or LRIC pricing. But it was looking for a measured policy response to the challenge explored in this paper.

As such, OFTEL's approach served as an important referent in the current policy debate. It recognized the problem and created the condition for an informed and open public debate to address it, rather than simply wishing that it would all go away if regulators let the Cable companies proceed. Differences in OFTEL's premises, as well as the specifics of the British policy discussion, meant that OFTEL's tentative answer might not have been right for America.⁸⁴

Since then, the Canadian government has announced a much more intrusive policy for approaching the relevant competition issues while OFTEL and the European Commission have redefined their approaches. In their terminology "joint dominance" addresses issues of "collective dominance" and "Significant Market Power." Collective dominance refers to a situation where a small group of oligopolists (presumably operating in an industry with homogenous product and high entry barriers) have a collective ability and incentive to impede competition in such a way as to restrict output or raise prices.⁸⁵ Significant Market Power does

⁸⁴ OFTEL began with some premises that the FCC might reject. For example, OFTEL was especially concerned about set-top boxes. And its analysis of market power was influenced by the fact the underlying network offering DSL in the UK has not been subject to unbundling in the same manner as in the United States.

⁸⁵ OFTEL, "Guidelines on Market Influence," March 2000, pars. 1.21-1.25. OFTEL notes that case law in the European Court limits the applicability of this concept but future rulings may expand the concept in such a way as to make it clearly applicable to many areas of communications policy.

not, in OFTEL's language, "require that the operator is able to act independently of its rivals."⁸⁶ (The European Commission presumes the minimum threshold for this power is a 25 percent share of the relevant market.)

The European Commission has suggested that "it would be appropriate for Member States to place an 'obligation to negotiate access' on a cable TV operator with significant market power for delivery of broadband services (or an obligation to grant access in the case of a dominant operator), with the possibility of NRA [National Regulatory Authority] intervention if commercial negotiation fails."⁸⁷

In our judgment OFTEL and the European Commission have focused excessively on the issue of pricing, and the ability of those with market power to raise prices to consumers, at the expense of addressing issues of manipulating the technical architecture of the network in such a way as to slow innovation and restrict competition. However, both authorities have recognized that such issues, if significant for competition, are of concern. For example, the European Commission has extended its analysis of digital television to the question of applications program interfaces that are crucial to interactive services. The Commission has noted the possibility that it may need to impose "compulsory licensing and publication" of the interfaces and require "functional interoperability."⁸⁸ This is analogous to the issues raised in this paper about broadband services.

The FCC has emphasized that technological innovation may resolve competition issues about broadband access before any regulatory intervention (that would inevitably impose some losses) could do much good. Perhaps. But in its anxiety not to stifle investment in cable television upgrades the FCC is proceeding too cautiously. It needs to examine the issues of the competitive implications of the architecture of broadband systems as carefully as it worked out the logic of open network architectures. Even a detailed public inquiry into these issues may deter some forms of anti-competitive behavior by sending a powerful signal that the government might intervene.

For the signal to be credible the Commission has to put rules in place that give it authority to act if it finds a problem. Having to go through a two-year rulemaking in order to

⁸⁶ OFTEL, "Market Influence," pars. 1.17-1.20

⁸⁷ European Commission, COM (1999) 539, "Towards a new framework for Electronic Communications infrastructure and associated services: The 1999 Communications Review" par. 4.24.

⁸⁸ European Commission, 4.2.5

establish the authority would make public inquiries toothless. Once the Commission has clearly affirmed its power to act, and a process for doing so, it can choose to forebear on detailed regulation if it wishes. But it should forebear while prominently and continually scrutinizing the market. Some of the questions may involve the effect of particular network architectures on competition and innovation. Some might look at generic questions like the desirability of allowing consumer purchase of set-top boxes and methods of lowering switching costs for consumers.

In closing, we would note that it would be highly desirable in itself if the United States again established itself as the international leader for broadband Internet policy. Silence in policy in the United States takes away America's significant advantage globally in shaping the policy for the next generation of global Internet services. Problems about how to assure competitive network infrastructure for broadband access exist everywhere in the world. The FCC's silence leaves a leadership vacuum in the global policy arena that others will surely fill, perhaps with results that the United States may not like.

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In re Petition of)	
)	
INTERNET VENTURES, INC.)	
INTERNET ON-RAMP, INC.)	
)	
For Declaratory Ruling that Internet Service)	Case Identifier CSR-5407-L
Providers are Entitled to Leased Access to)	
Cable Facilities Under Section 612 of the)	
Communications Act of 1934, as Amended)	

Supplemental Affidavit of William Shapiro

1. My name is William Shapiro. I previously submitted an affidavit in this proceeding accompanying the initial comments of the Vermont Department of Public Service. That affidavit sets forth my qualifications.
2. I have been asked to address the claim by cable companies filing comments in this proceeding that if ISPs receive access to cable facilities under Section 612 of the Communications Act, as amended, their incentives to invest in cable infrastructure will be undermined.
3. I see no empirical evidence to support this contention. Microsoft, for example, has announced plans to invest nearly half a billion dollars in Rogers, a Canadian cable company -- notwithstanding that Canada imposes an open access obligation on cable systems to provide cable capacity to ISPs.
4. Cable companies deploying cable modems over upgraded networks enjoy a temporary technological advantage over other competing forms of high speed technologies that they have every incentive to seize upon. Currently, Hughes offers a hybrid service, DirecPC, offering 56kb/s upstream via telephone modem and 400kb/s downstream via satellite. These are speeds that still are less than the speeds available from cable. Cable modems can offer an approximate speed of 10 Mb/s downstream, and up to 30 Mb/s. with slower upstream speeds varied and priced accordingly. To be sure, companies like Hughes Electronics have announced plans to offer higher speed satellite services - speeds higher than current cable speeds - but these plans, like Hughes' Spaceway service, are still several years away from deployment. Cable

companies are not likely to squander the opportunity to continue upgrading their networks to provide high speed Internet service to new subscribers when there is such a premium in enrolling new subscribers first. I should add that, while competition from satellite companies to offer higher speed Internet connections is a good thing, it does not diminish the importance of protecting competition among Internet service providers. Satellite/cable competition will help to limit monopoly pricing of the "pipe" into the home, but it won't assure vigorous competition among ISPs (or between cable company video programming and video programming offered by ISPs).

5. To the extent that the cable companies perceive technologies like DSL and high speed satellite services to pose competitive threats, this will provide the cable companies an *added* incentive, not a disincentive to invest in expansion of their operating plant. Cable companies are in the business of selling capacity. The more subscribers they add, the more channels they get subscribers to use, the more money they make. It makes no sense to conclude that the cable companies will forego additional carriage business just because they would not be the exclusive providers of Internet service on their facilities.
6. If the cable company argument had any validity, it seems to me, the obligation that cable companies concede they have to provide access to traditional video programmers would *also* have served as a disincentive to investment. In other words, the cable companies could as easily argue that if they are obligated to carry competing video programming of any kind, they will have no incentive to expand their systems. This argument, I would add, also ignores the fact that cable companies are only obliged to set aside a small portion of their capacity for leased access.
7. Cable's assertions that continued investment in its balkanized info autobahn will be endangered by open access are nothing but hollow, empty threats. They make no business sense whatsoever and are an insult to the public.